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Thiyagarajan et al.

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(54) **DISHWASHER APPLIANCES HAVING DEFLECTION ASSEMBLIES**

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A47L 15/16	(2006.01)

(52) **U.S. Cl.**

CPC ***A47L 15/4282*** (2013.01); ***A47L 15/16*** (2013.01)

(58) **Field of Classification Search**

CPC A47L 15/4282

See application file for complete search history.

(56) **References Cited**

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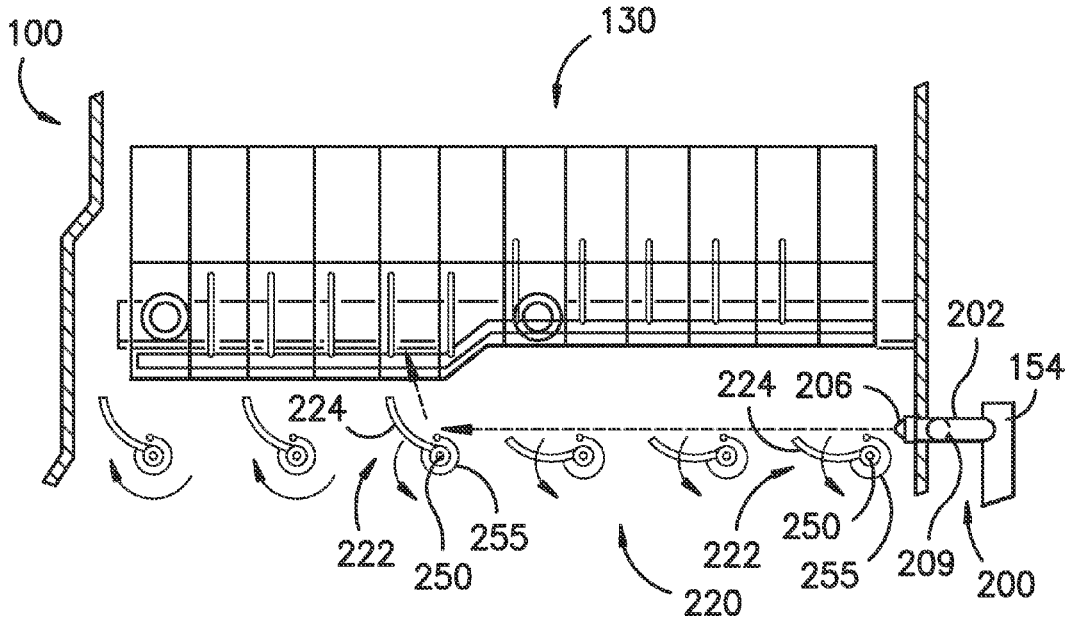
(57) **ABSTRACT**

Dishwasher appliances are provided. A dishwasher appliance includes a tub that defines a wash chamber for receipt of articles for washing, and a rack assembly arranged within the tub. The dishwasher appliance further includes a fluid ejection assembly, the fluid ejection assembly including an ejection head disposed within the wash chamber, the ejection head operable to eject fluid into the wash chamber. In one embodiment, the dishwasher appliance further includes a passive deflection assembly, the passive deflection assembly including a deflection unit disposed within the wash chamber for deflecting fluid from the ejection head towards the rack assembly. In another embodiment, the dishwasher appliance further includes a deflection assembly, the deflection assembly including a deflection unit disposed within the wash chamber for deflecting fluid from the ejection head towards the rack assembly, the deflection assembly further including a magnet operable to move the deflection unit.

13 Claims, 8 Drawing Sheets



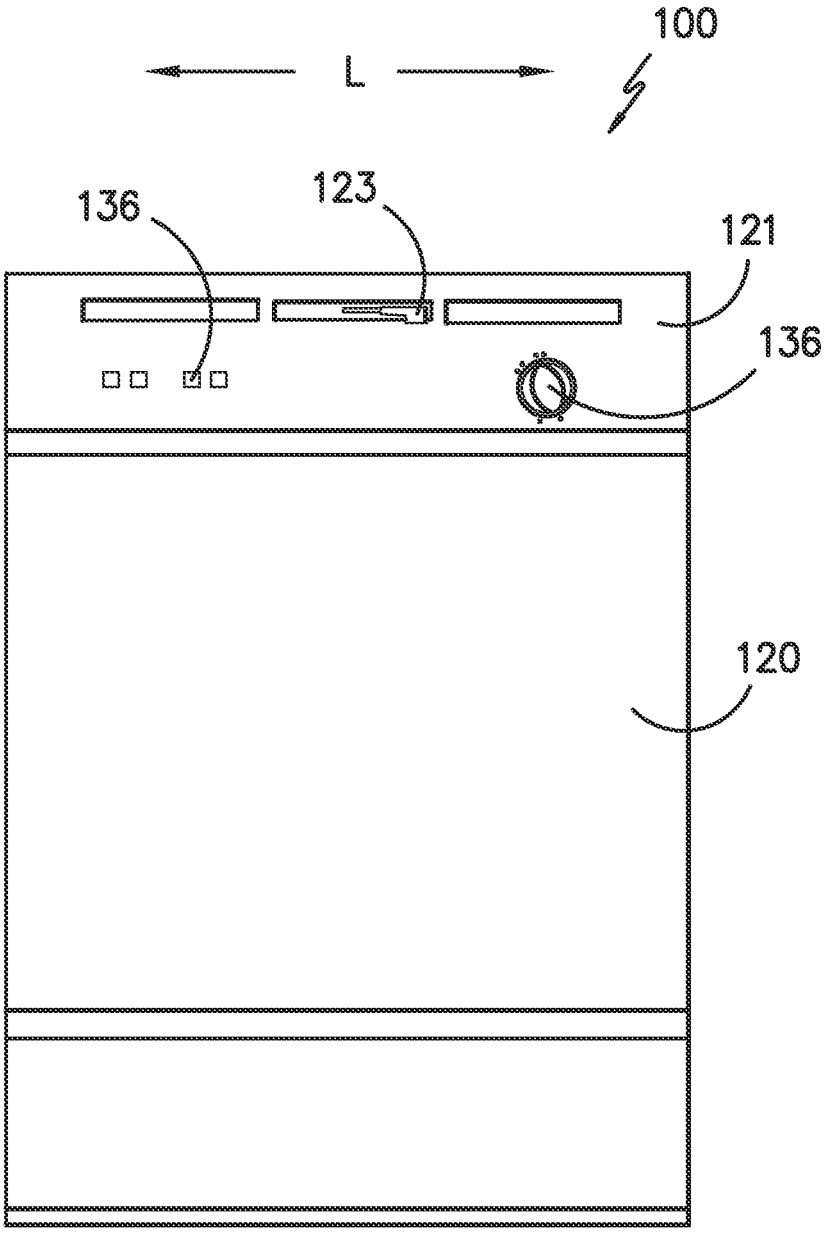
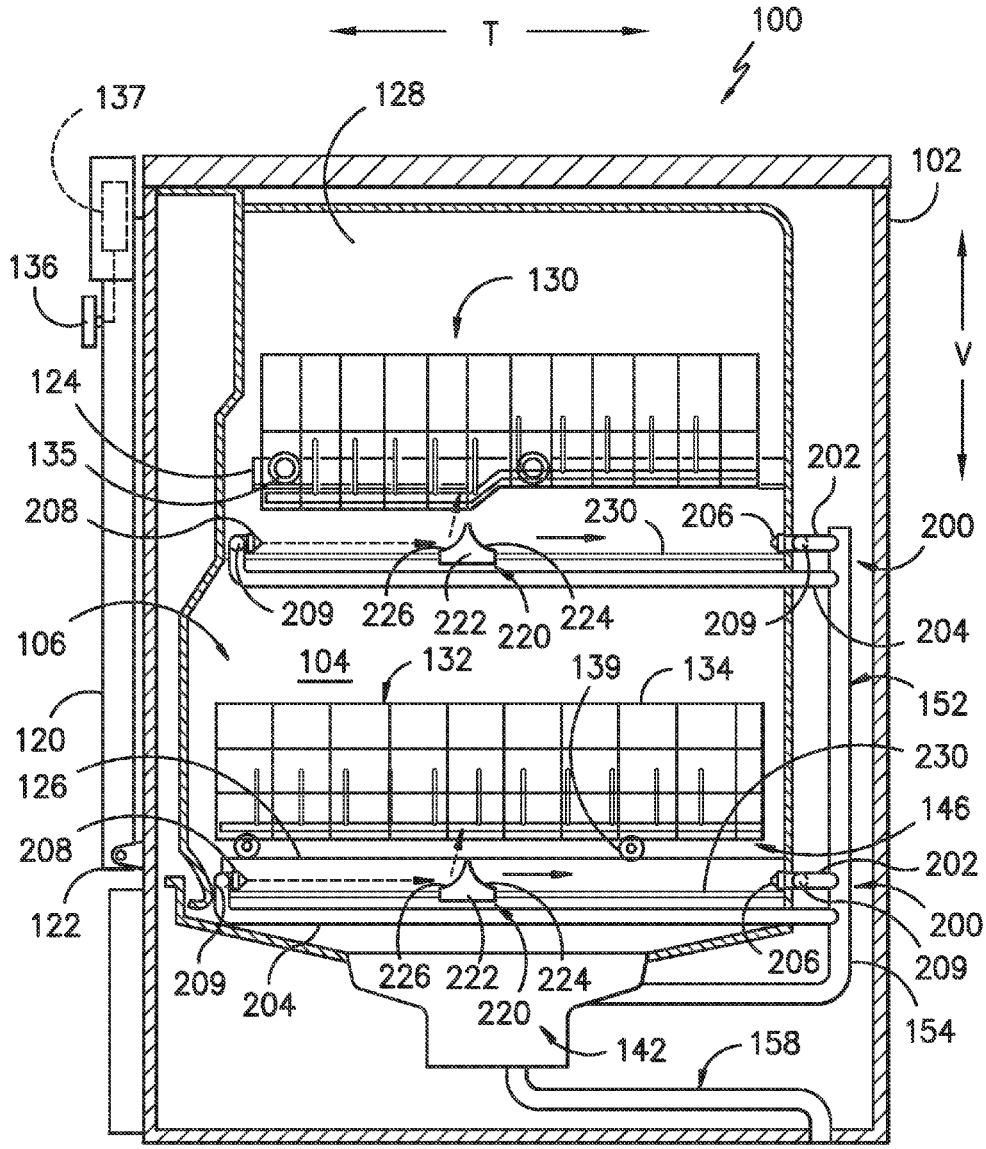


FIG. -1-


T
100
137
128
102
136
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V
124
135
202
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206
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226
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209
204
106
104
132
139
134
152
120
230
126
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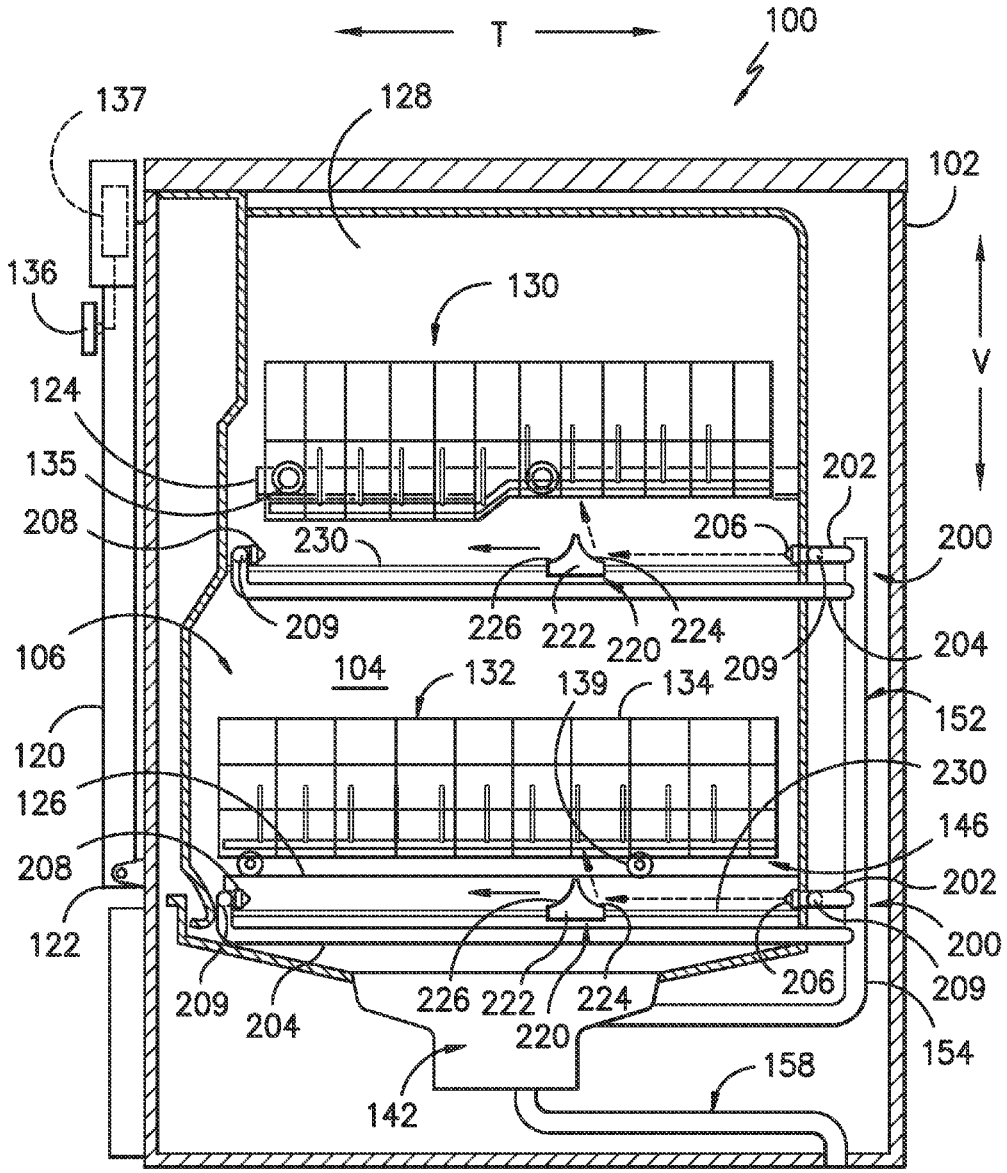
122
200
209
206
209
204
226
222
224
220
154
142
158

FIG. -2-


T
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137
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106
104
132
139
134
209
152
120
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126
146
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122
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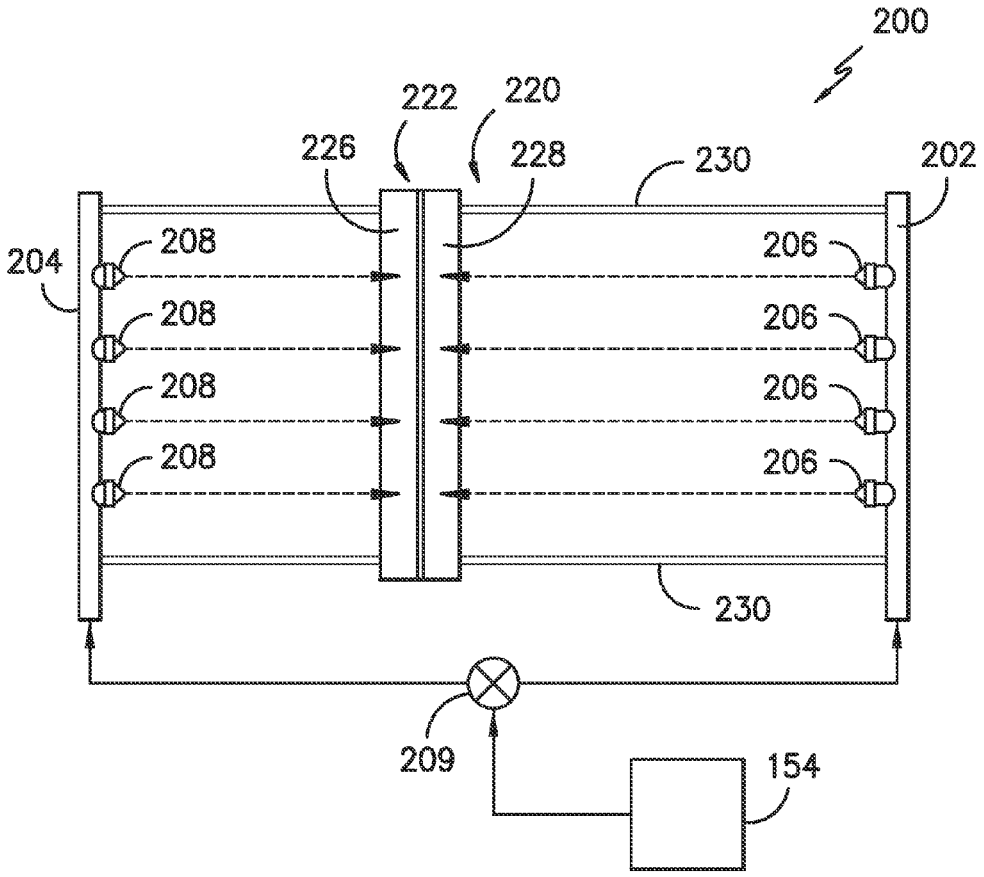
158
142

FIG. -3-


200
222
220
226
228
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202
204
208
206
208
206
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206
208
206
230
209
154

FIG. -4-

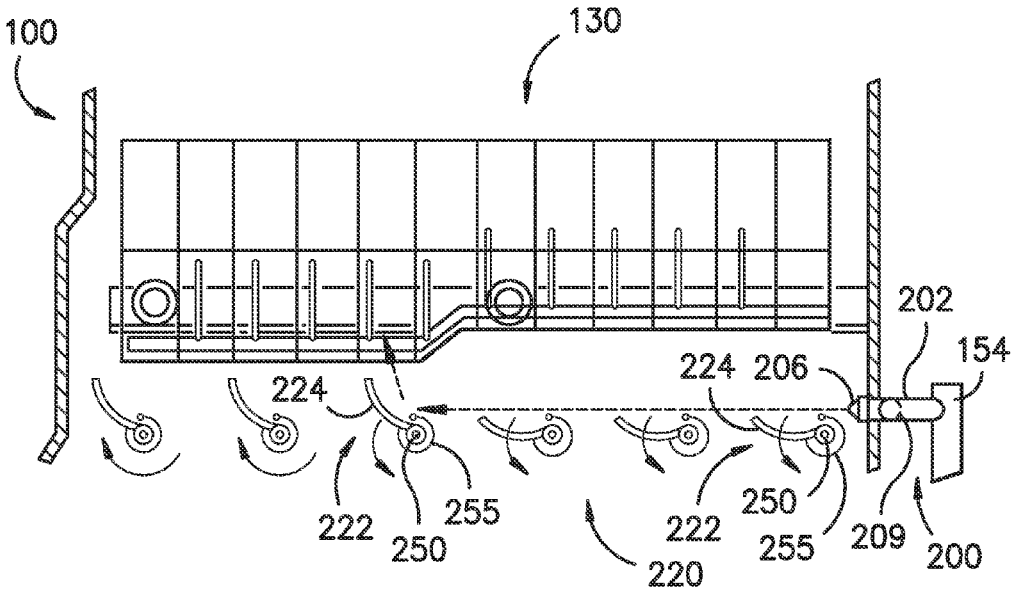
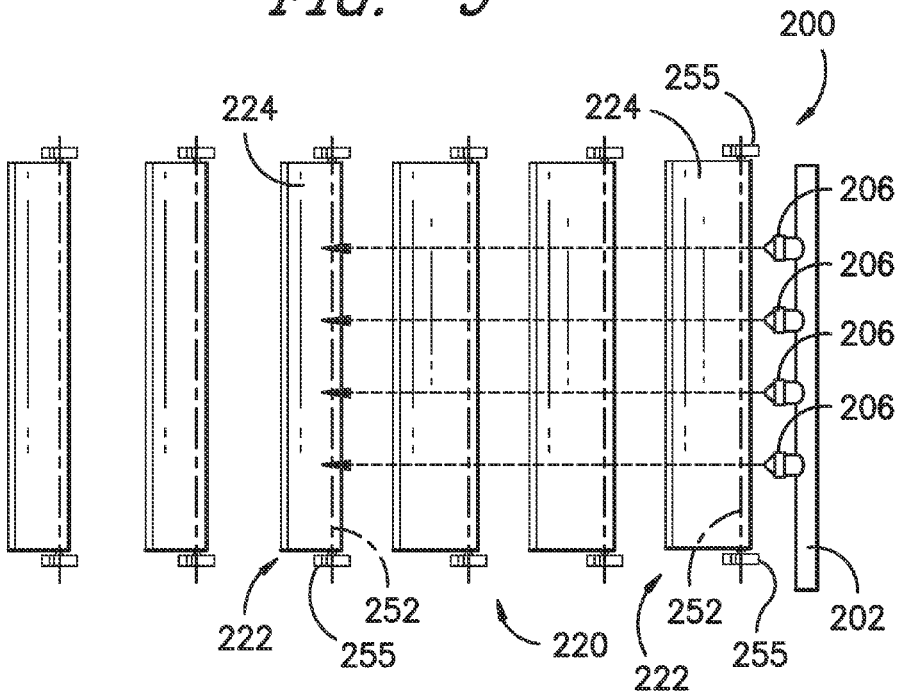

100
130
202
154
224
206
224
222
250
255
222
250
255
209
200
220

FIG. -5-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255
224
224
206
206
206
206
222
252
255
220
252
255
202
222

FIG. -6-

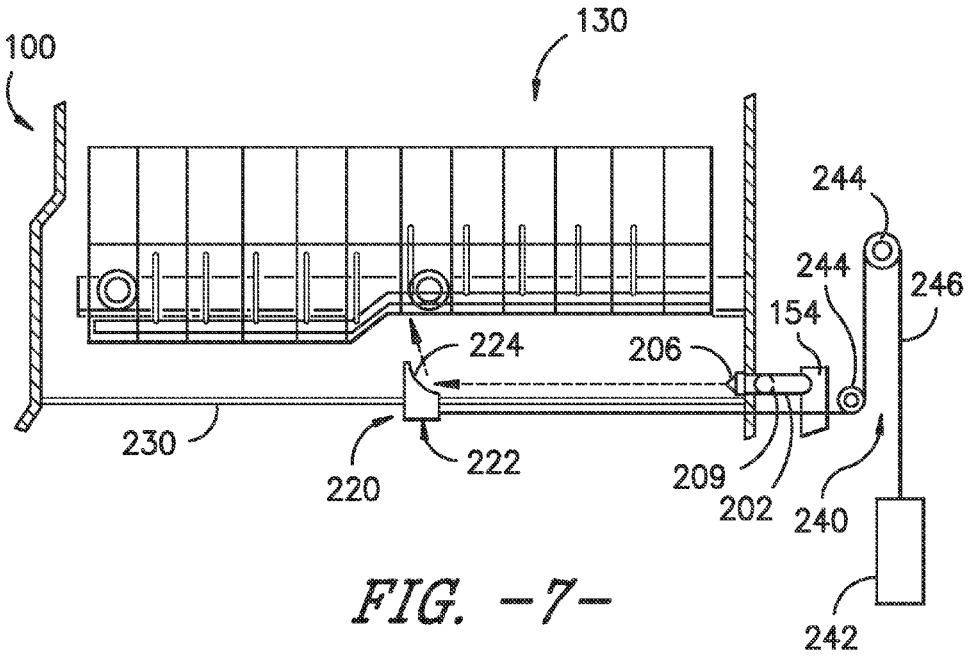

100
130
244
244
246
154
224
206
230
220
222
209
202
240
242

FIG. -7-

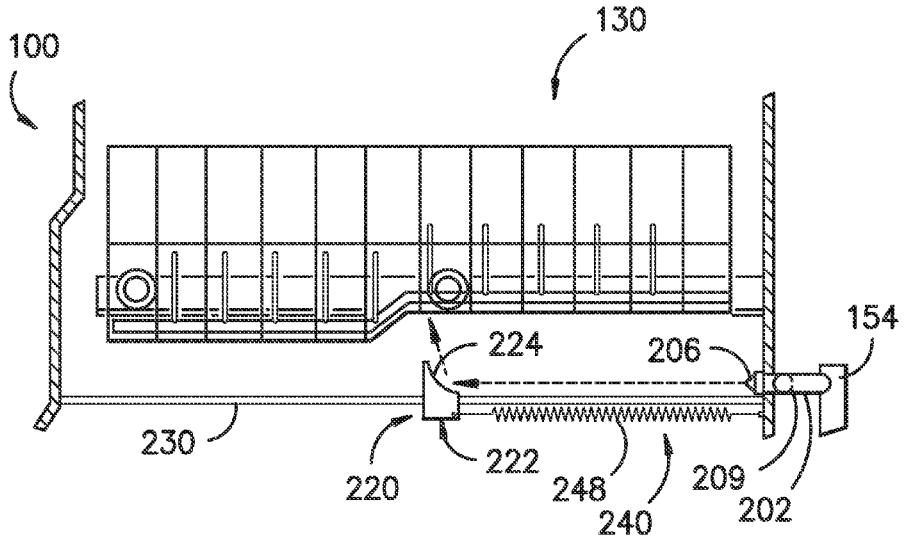

100
130
154
224
206
230
220
222
248
240
209
202

FIG. -8-

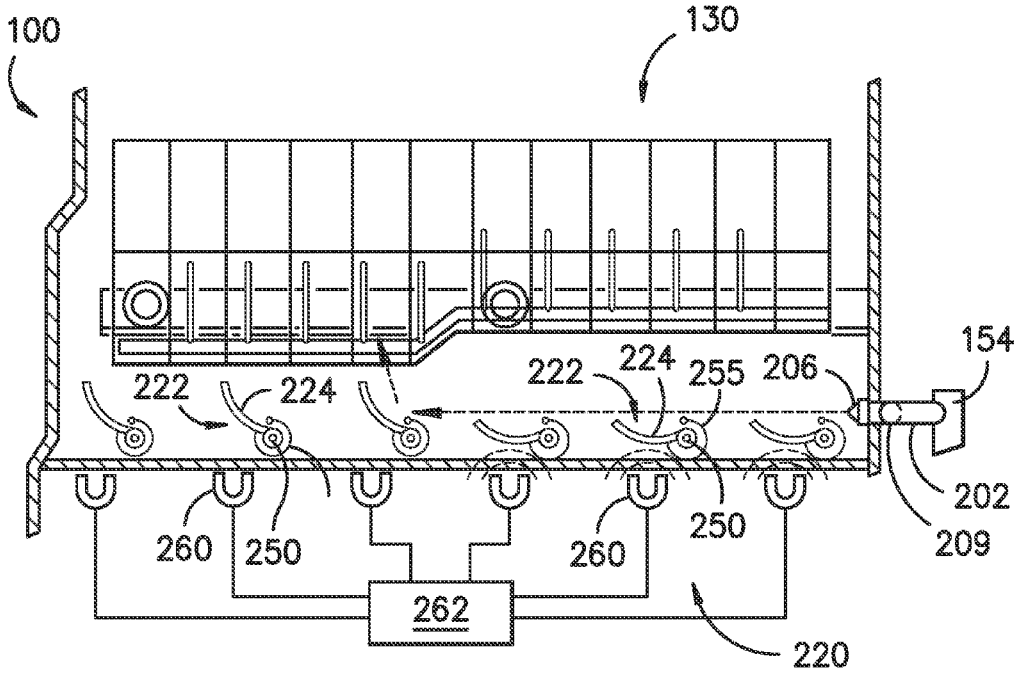
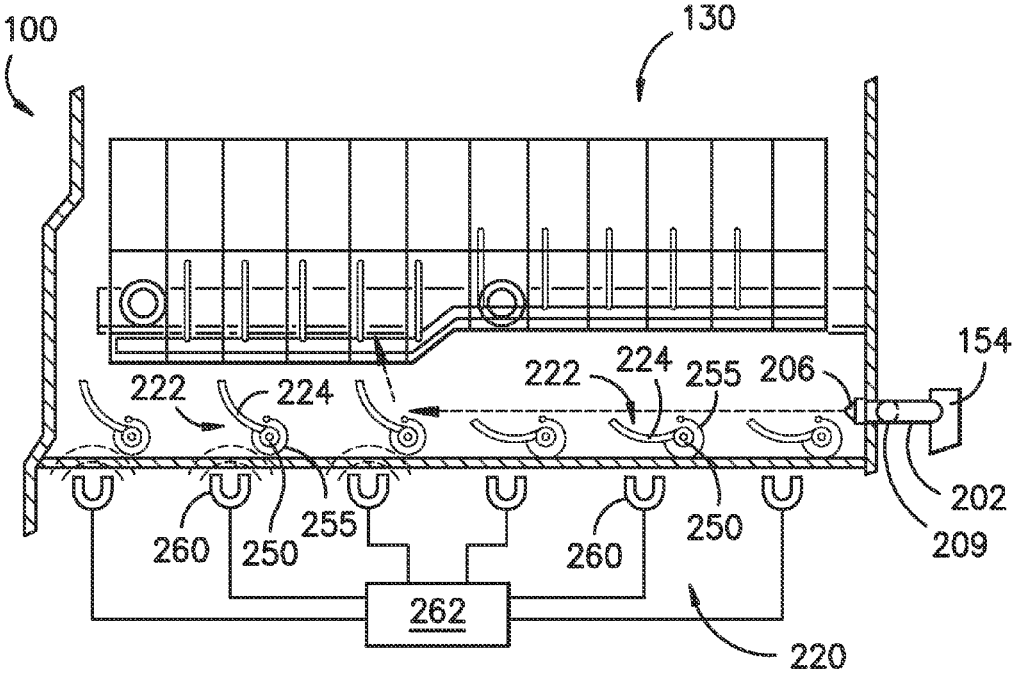

100
130
154
222
224
222
224
255
206
202
209
260
250
260
250
262
220

FIG. -9-


100
130
154
222
224
222
224
255
206
202
209
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262
220

FIG. -10-

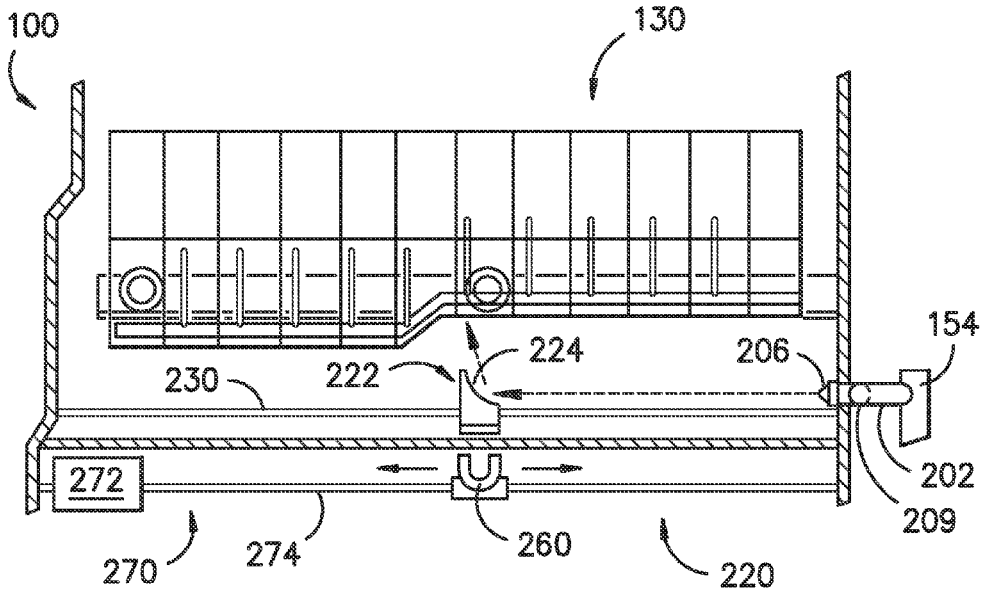

FIG. -11-

DISHWASHER APPLIANCES HAVING DEFLECTION ASSEMBLIES

FIELD OF THE INVENTION

The subject matter of the present disclosure relates generally to dishwasher appliances, and more particularly to dishwasher appliances having deflection assemblies which direct fluid, such as wash fluid, within the tubs of dishwasher appliances.

BACKGROUND OF THE INVENTION

Dishwasher appliances generally include a tub that defines a wash compartment. Rack assemblies can be mounted within the wash compartment of the tub for receipt of articles for washing. In a typically known dishwasher appliance, spray assemblies within the wash compartment can apply or direct wash fluid towards articles disposed within the rack assemblies in order to clean such articles. Multiple spray assemblies can be provided including e.g., a lower spray arm assembly mounted to the tub at a bottom of the wash compartment, a mid-level spray arm assembly mounted to one of the rack assemblies, and/or an upper spray assembly mounted to the tub at a top of the wash compartment. Typically, the spray arms rotate in a circular pattern when operating to direct wash fluid into the tub.

Such presently known dishwasher appliances, however, can be ineffective at directing wash fluid to the corners of the tub. Dishwasher tubs are typically cube shaped, and the circular pattern of rotation of typical spray arms may not effectively direct wash fluid into the corners of such cube shapes.

U.S. Patent Application Publication No. 2013/0319487, filed Jun. 5, 2013 and entitled "Dish Washing Machine" discloses an active motor-driven deflector assembly for directing water within the tub of a washing machine. However, the active and motor-driven nature of such assembly may result in frequent motor component failure, which can in turn require expensive and time-consuming replacement.

Accordingly, improved apparatus for directing fluid flow within the tubs of dishwasher appliances is desired in the art. For example, improved apparatus which can facilitate the direction of fluid into the corners of the tub would be advantageous.

BRIEF DESCRIPTION OF THE INVENTION

In accordance with one embodiment, a dishwasher appliance is provided. The dishwasher appliance includes a tub that defines a wash chamber for receipt of articles for washing, and a rack assembly arranged within the tub. The dishwasher appliance further includes a fluid ejection assembly, the fluid ejection assembly including an ejection head disposed within the wash chamber, the ejection head operable to eject fluid into the wash chamber. The dishwasher appliance further includes a passive deflection assembly, the passive deflection assembly including a deflection unit disposed within the wash chamber for deflecting fluid from the ejection head towards the rack assembly.

In accordance with another embodiment, a dishwasher appliance is provided. The dishwasher appliance includes a tub that defines a wash chamber for receipt of articles for washing, and a rack assembly arranged within the tub. The dishwasher appliance further includes a fluid ejection assembly, the fluid ejection assembly including an ejection head disposed within the wash chamber, the ejection head operable to eject fluid into the wash chamber. The dishwasher appliance further includes a deflection assembly, the deflection assembly including a deflection unit disposed within the wash chamber for deflecting fluid from the ejection head towards the rack assembly, the deflection assembly further including a magnet operable to move the deflection unit.

These and other features, aspects, and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

A full and enabling disclosure of the present invention including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures, in which:

FIG. **1** provides a front view of a dishwasher appliance in accordance with one embodiment of the present disclosure;

FIG. **2** provides a side cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with fluid from second ejection heads causing translation of a deflection unit in a second direction;

FIG. **3** provides a side cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with fluid from first ejection heads causing translation of a deflection unit in a first direction;

FIG. **4** provides a top cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with fluid from first and second ejection heads contacting a deflection unit;

FIG. **5** provides a partial side cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with fluid from an ejection head causing rotation of various deflection units into bypass positions;

FIG. **6** provides a top cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with fluid from ejection heads causing rotation of various deflection units into bypass positions;

FIG. **7** provides a partial side cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with fluid from an ejection head causing translation of a deflection unit in a first direction and an embodiment of a mechanical energy storage device biasing the deflection unit in a second opposing direction;

FIG. **8** provides a partial side cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with fluid from an ejection head causing translation of a deflection unit in a first direction and another embodiment of a mechanical energy storage device biasing the deflection unit in a second opposing direction;

FIG. **9** provides a partial side cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with activated magnets causing rotation of deflection units into bypass positions;

FIG. **10** provides a partial side cross-sectional view of a dishwasher appliance in accordance with one embodiment of the present disclosure with activated magnets causing rotation of deflection units into deflecting positions; and

FIG. **11** provides a partial side cross-sectional view of a dishwasher appliance in accordance with one embodiment

of the present disclosure with translation of a magnet causing translation of a deflection unit.

DETAILED DESCRIPTION OF THE INVENTION

Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

As used herein, the term "article" may refer to, but need not be limited to, dishes, pots, pans, silverware, and other cooking utensils and items that can be cleaned in a dishwashing appliance. The term "wash cycle" is intended to refer to one or more periods of time during the cleaning process where a dishwashing appliance operates while containing articles to be washed and uses a detergent and water, preferably with agitation, to e.g., remove soil particles including food and other undesirable elements from the articles. The term "rinse cycle" is intended to refer to one or more periods of time during the cleaning process in which the dishwashing appliance operates to remove residual soil, detergents, and other undesirable elements that were retained by the articles after completion of the wash cycle. The term "drying cycle" is intended to refer to one or more periods of time in which the dishwashing appliance is operated to dry the articles by removing fluids from the wash chamber. The term "fluid" refers to a liquid used for washing and/or rinsing the articles and is typically made up of water that may include additives such as e.g., detergent or other treatments.

FIGS. **1** and **2** depict an exemplary domestic dishwasher appliance **100** that may be configured in accordance with aspects of the present disclosure. For the particular embodiment of FIGS. **1** and **2**, the dishwasher **100** includes a cabinet **102** having a tub **104** therein that defines a wash chamber **106**. The tub **104** includes a front opening (not shown) and a door **120** hinged at its bottom **122** for movement between a normally closed vertical position (shown in FIGS. **1** and **2**), wherein the wash chamber **106** is sealed shut for washing operation, and a horizontal open position for loading and unloading of articles from the dishwasher. Latch **123** is used to lock and unlock door **120** for access to chamber **106**.

In the embodiment shown, upper and lower guide rails **124**, **126** are mounted on tub side walls **128** and accommodate rack assemblies **130** and **132**, which may be roller-equipped. Each of the rack assemblies **130**, **132** as shown is fabricated into lattice structures including a plurality of elongated members **134** (for clarity of illustration, not all elongated members making up assemblies **130** and **132** are shown in FIG. **2**). Each rack assembly **130**, **132** is arranged in the wash chamber **106**, such that the rack assembly **130**, **132** is capable of movement between an extended loading position (not shown) in which the rack is substantially positioned outside the wash chamber **106**, and a retracted position (shown in FIGS. **1** and **2**) in which the rack is located inside the wash chamber **106**. This is, for example, facilitated by rollers **135** and **139**, for example, mounted onto rack assemblies **130** and **132**, respectively. A silverware basket (not shown) may be removably attached to rack assembly **132** for placement of silverware, utensils, and the like, that are otherwise too small to be accommodated by the rack assemblies **130**, **132**.

Dishwasher appliance **100** further includes a fluid circulation assembly **152** for circulating water and dishwasher fluid in the tub **104**. Fluid circulation assembly **152** may further include a circulation conduit **154** which supplies the fluid to one or more fluid ejection assemblies, as discussed herein. The conduit **154** may, for example, be in fluid communication with a sump **142** such that fluid can flow from the sump **142** into the conduit **154** as required.

As mentioned, dishwasher assembly **100** further includes sump **142**, which may be provided in lower region **146**, such as below the rack assemblies **130**, **132**. Sump **142** generally collects fluid from the wash chamber **106** for circulation within the tub **104**, such as back into the wash chamber **106** through fluid circulation assembly **152**, as well as drainage from the tub **104** and dishwasher appliance **100** in general. Drainage may occur, for example, through a drain conduit **158** which is provided for draining fluid from the sump **142**. The conduit **158** may, for example, be in fluid communication with the sump **142** such that fluid can flow from the sump **142** into the conduit **158** as required. Drain conduit **158** may flow the fluid from the sump **142** to, for example, external plumbing or another suitable drainage location.

The dishwasher **100** is further equipped with a controller **137** to regulate operation of the dishwasher **100**. The controller may include one or more memory devices and one or more microprocessors, such as general or special purpose microprocessors operable to execute programming instructions or micro-control code associated with a cleaning cycle. The memory may represent random access memory such as DRAM, or read only memory such as ROM or FLASH. In one embodiment, the processor executes programming instructions stored in memory. The memory may be a separate component from the processor or may be included onboard within the processor.

The controller **137** may be positioned in a variety of locations throughout dishwasher **100**. In the illustrated embodiment, the controller **137** may be located within a control panel area **121** of door **120** as shown in FIGS. **1** and **2**. In such an embodiment, input/output ("I/O") signals may be routed between the control system and various operational components of dishwasher **100** along wiring harnesses that may be routed through the bottom **122** of door **120**. Typically, the controller **137** includes a user interface panel/controls **136** through which a user may select various operational features and modes and monitor progress of the dishwasher **100**. In one embodiment, the user interface **136** may represent a general purpose I/O ("GPIO") device or functional block. In one embodiment, the user interface **136** may include input components, such as one or more of a variety of electrical, mechanical or electro-mechanical input devices including rotary dials, push buttons, and touch pads. The user interface **136** may include a display component, such as a digital or analog display device designed to provide operational feedback to a user. The user interface **136** may be in communication with the controller **137** via one or more signal lines or shared communication busses.

It should be appreciated that the invention is not limited to any particular style, model, or configuration of dishwasher. The exemplary embodiment depicted in FIGS. **1** and **2** is for illustrative purposes only. For example, different locations may be provided for user interface **136**, different

configurations may be provided for rack assemblies **130**, **132**, and other differences may be applied as well.

Referring now to FIGS. **2** through **11**, dishwasher appliances **100** in accordance with the present disclosure further include various features for directing the flow of fluid into the wash chamber **106** towards the rack assemblies **130**, **132** and towards the corners of the tub **104**. In particular, dishwasher appliances **100** in accordance with the present disclosure may include deflection assemblies which include movable deflection units. Fluid that is ejected from ejection heads into the wash chamber may contact the deflection units and be generally deflected towards one or more rack assemblies **130**, **132**. The movement of the deflection units in some embodiments can be translational, such as along generally linear directions (for example, front-to-back and vice versa or side-to-side and vice versa). In other embodiments, the movement of the deflection units can be rotational, with the deflection units pivoting between deflecting positions wherein fluid ejected from the ejection heads contacts the deflection units and bypass positions wherein fluid ejected from the ejection heads bypass the deflection units. Such deflection assemblies may advantageously direct fluid towards the corners of the tub **104**, and may additionally be cost-effective and durable solutions for such fluid flow direction.

As illustrated dishwasher assembly **100** may include one or more fluid ejection assemblies **200**. Each fluid ejection assembly **200** may, for example, be in fluid communication with the fluid circulation assembly **152**, such that fluid flows from the fluid circulation assembly **152** into the fluid ejection assembly **200** and through the fluid ejection assembly **200** for ejection into the wash chamber **106**. A fluid ejection assembly **200** may, for example, include one or more conduits, such as first conduits **202** and optional second conduits **204** as shown. The conduits **202**, **204** may be in fluid communication with the fluid circulation assembly **152**. The conduits **202**, **204** may be entirely exterior to the wash chamber **106**, or the conduits **202**, **204** or portions thereof may be disposed within the wash chamber **106**. Fluid ejection assembly **200** may further include, for example, one or more ejection heads, such as first ejection heads **206** and optional second ejection heads **208** as shown. Each ejection head may be disposed within the wash chamber **106** and may be in fluid communication with an associated conduit. Further, each ejection head may be operable to eject fluid therefrom in an ejection direction in the wash chamber **106**. Fluid may thus flow from an associated conduit through an ejection head, and be ejected from the ejection head into the wash chamber **106**. In embodiments wherein first conduits **202** and associated first ejections heads **206** as well as second conduits **204** and associated second ejections heads **208** are utilized, valves **209** may be utilized to direct flow to the first conduits **202**, second conduits **204** or both.

As discussed, fluid may be flowed from each ejection head **206**, **208** into the wash chamber **106**. Fluid from a first ejection head **206** may flow in a first direction in the wash chamber **106**, and fluid from a second ejection head **208** may flow in a second direction in the wash chamber **106**. In exemplary embodiments, as shown, the fluid may be flowed into the wash chamber **106** along a generally horizontal path. Further, in some embodiments wherein first ejections heads **206** and second ejections heads **208** are utilized, the second ejection heads **208** may be facing in opposing directions relative to the first ejection heads **206**, such that the second direction of fluid flow from the second ejection heads **208** is opposite to the first direction of fluid flow from the first ejection heads **206**. It should be understood, however, that any suitable flow path for fluid flowed from the ejection heads **206**, **208** is within the scope and spirit of the present disclosure.

Dishwasher assembly **100** may further include one or more deflection assemblies **220**. Each deflection assembly **220** is generally operable to deflect fluid flowed into the wash chamber **106** from the ejection heads **206**, **208**, thus changing the direction of the fluid. Specifically, the fluid flow may be deflected towards one or both rack assemblies **130**, **132**, such as in a generally vertical direction. Notably, the fluid flow generally along a vertical direction may be generally upwards as illustrated, or generally downwards. Further, the positioning and movement of the deflection assemblies **220** and components thereof may advantageously facilitate the flow the fluid towards the corners of the tub **104**, and towards articles in the rack assemblies **130**, **132** that are positioned proximate such corners in the wash chamber **106**.

A deflection assembly **220** includes one or more deflection units **222**. Each deflection unit **222** is disposed within the wash chamber **106** for deflecting fluid from one or more ejection heads **206**, **208** towards a rack assembly **130**, **132**. Further, each deflection unit **222** may be movable within the wash chamber **106**. Each deflection unit **222** includes one or more deflection surfaces. Fluid from the ejection heads **206**, **208** may contact the deflection surfaces to be deflected and thus change flow direction. For example, a deflection unit **222** may include a first deflection surface **224**, which may for example face first ejection heads **206** to deflect fluid flow therefrom. Deflection unit **222** may further, in embodiments wherein second ejection heads are utilized, include a second deflection surface **226**, which may for example face second ejection heads **208** to deflect fluid flow therefrom. The second deflection surface **226** may, for example, face opposite to the first deflection unit **224**. In exemplary embodiments as illustrated, a deflection surface **224**, **226** may have a curvilinear profile. Alternatively, a deflection surface **224**, **226** may have a linear profile, or portions thereof may be linear and curvilinear.

Referring now to FIGS. **2** through **8**, in some exemplary embodiments, a deflection assembly **220** is a passive deflection assembly. Because the deflection assembly **220** in these embodiments is passive, no active components are included in the assembly **220** to cause movement of the components thereof, such as the deflection units **222**. Movement of such components in a passive system is thus caused only by fluid force acting on the components from the ejection heads and, in some embodiments, various passive biasing apparatus.

FIGS. **2** through **4** illustrate one embodiment of a passive deflection assembly **220**. In these embodiments, each deflection unit **222** includes a first deflection surface **224** for deflecting fluid from one or more first ejection heads **206** and a second opposing deflection surface **226** for deflecting fluid from one or more second ejection heads **208**. One or more first ejection heads **206** are operable to eject fluid in a first ejection direction towards the first deflection surface **224**, and one or more second ejection heads **208** are operable to eject fluid in a second opposing direction towards the second deflection surface **226**. Notably, the deflection assembly **220** may further include one or more guide rails **230**, which may for example be rods as shown, channels, or other suitable guide rails. The guide rails **230** may extend generally horizontally within the wash chamber **106**, such as in a front-to-back or side-to-side orientation. A deflection unit **222** may be movably connected to the guide rails **230**, such as translatably connected as shown. For example, holes may be defined in the deflection unit **222** through which the rods

may extend, or the deflection unit **222** may be otherwise movably mounted to the guide rails. The deflection unit may thus be movable, such as translatable, along the guide rails **230** due to fluid force acting on the deflection unit **222**.

FIG. **2** illustrated movement of the deflection unit **222** in a second direction towards the first ejection heads **206** due to fluid force on the second deflection surface **226** from the second ejection heads **208**. Further, the fluid flowed from the second ejection heads **208** may, after contacting the second deflection surface **226**, be deflected to a different direction, such as a generally vertical direction towards a rack assembly **130**, **132**. Notably, in this embodiment, fluid is flowing only from the second ejection heads **208**.

FIG. **3** illustrated movement of the deflection unit **222** in a first direction towards the second ejection heads **208** due to fluid force on the first deflection surface **224** from the first ejection heads **206**. Further, the fluid flowed from the first ejection heads **206** may, after contacting the first deflection surface **224**, be deflected to a different direction, such as a generally vertical direction towards a rack assembly **130**, **132**. Notably, in this embodiment, fluid is flowing only from the first ejection heads **206**.

FIG. **4** illustrates the deflection unit **222** in a stationary position, due to equal fluid force on the first and second deflection surfaces **224**, **226** from the first and second ejection heads **206**, **208**. Notably, fluid may also be flowed from the first and second ejection heads **206**, **208** such that the fluid force on the first and second deflection surfaces **224**, **226** is unequal, so that the deflection unit **222** moves in the first or second direction. The disparity in force may be adjusted to control the speed with which the deflection unit **222** travels in the first or second direction.

Referring now to FIGS. **7** and **8**, in alternative embodiments, a passive deflection assembly **220** may include one or more mechanical energy storage devices **240**. Each mechanical energy storage device **240** biases the associated deflection unit **222** towards one or more ejection heads. For example, in the embodiments shown, only first ejection heads **206** are utilized, and the deflection unit **222** only includes first deflection surface **224**. The deflection unit **222** is translatable on guide rails **230**. Accordingly, fluid force from the first ejection heads **206** causes movement of the deflection unit **222** in a first direction away from the first ejection heads **206**. Further, the fluid flowed from the first ejection heads **206** may, after contacting the first deflection surface **224**, be deflected to a different direction, such as a generally vertical direction towards a rack assembly **130**, **132**. Notably, in these embodiments, the fluid force must be high enough to overcome the biasing force of the mechanical energy storage devices **240** for the deflection unit **222** to move away from the ejection heads **206**. When the biasing force of the mechanical energy storage devices **240** is higher than the fluid force, the deflection unit **222** may move towards the ejection heads **206**. When the biasing force and the fluid force are equal the deflection unit **222** may be stationary.

In some embodiments, as shown in FIG. **7**, a mechanical energy storage device **240** may include a pulley assembly and a load member **242**. The pulley assembly may include one or more pulleys **244**. The device **240** may further include a connecting member **246**, which may be a rope, chain, etc. The connecting member **244** may connect the deflection unit **222** and the load member **242**, which have a suitable mass to provide a suitable biasing force to the deflection unit **222**. The connecting member **246** may be movable along the pulleys **244** due to movement of the deflection unit **222** and the load member **242** based on the disparity between the biasing force and the fluid force.

In other embodiments, as shown in FIG. **8**, a mechanical energy storage device **240** may include a spring **248**. The spring **248** may be connected to the deflection unit **222** at one end and, for example, the tub **104** or another suitable component of the appliance **100** at the other end. As the deflection unit **222** moves away from the ejection heads **206**, the biasing force of the spring **248** may increase, as is generally understood.

Referring now to FIGS. **5** and **6**, in alternative embodiments, a passive deflection assembly **220** may include one or more pivot rails **250**. A deflection unit **222** may be connected to the pivot rail **250**. In exemplary embodiments, each pivot rail **250** is for example a rod. Further, in exemplary embodiments as shown, a plurality of deflection units **222** and a plurality of pivot rails **250** are utilized, with a deflection unit **222** connected to each pivot rail **250**. The plurality of pivot rails **250** and associated deflection units **222** may be spaced apart, such as along the direction of flow of fluid from the associated ejection head. Further, each deflection unit **222** may be rotatable about a pivot axis **252** defined by the connected pivot rail **250** (such as extending longitudinally through the pivot rail **250**). In particular, the deflection unit **222** may be rotatable about the pivot axis **252** due to fluid force acting on the deflection unit **222**. A deflection unit **222** may be rotatable relative to the associated pivot rail **250**, or the deflection unit **222** may be fixidly connected to the pivot rail **250** and both the deflection unit **222** and pivot rail **250** may be rotatable.

As shown, each deflection unit **222** may be rotatable between a deflecting position, wherein fluid ejected from ejection heads such as heads **206** contacts the deflection unit **222**, and a bypass position, wherein fluid ejected from ejection heads such as heads **206** bypasses and thus generally does not contact the deflection unit **222**. As illustrated, fluid from ejection heads **206** contacts the first surface **224** of a deflection unit **222**. When the fluid is contacting the first surface **224**, the deflection unit **222** is in a deflecting position. When the fluid force is high enough, however, the fluid force may cause the deflection unit **222** to rotate to the bypass position. The fluid may then contact the first surface **224** of a subsequent deflection unit **222**. FIG. **5** illustrates a plurality of deflection units **222** in bypass positions and a plurality of deflection units **222** in deflecting positions.

As further illustrated in FIGS. **5** and **6**, the passive deflection assembly **220** may further include one or more biasing elements **255**. Each biasing element **255** may bias an associated deflection unit **222** towards a deflecting position. In exemplary embodiments, a biasing element **255** is a spring, as shown. The spring may be connected between the deflection unit **222** and pivot rail **250**, or between the pivot rail **250** or deflection unit **222** and tub **104** or other suitable component. Accordingly, the fluid force may be required to overcome the biasing force to rotate the deflection unit **222** into the bypass position. Notably, biasing elements **255** with generally identical or varying biasing forces may be utilized for each of the plurality of deflection units **222**.

Referring now to FIGS. **9** through **11**, in other exemplary embodiments, a deflection assembly **220** may utilize magnetic fields to cause movement of the various components thereof, such as the deflection units **222**. Accordingly, a deflection assembly **220** may, for example, further include one or more magnets **260**, each of which may be operable to move a deflection unit **222**. In some embodiments, as illustrated in FIGS. **9** and **10**, a magnet **260** may be an electromagnet, which may be actuated such that the mag-

netic fields emanating from the magnet **260** are activated or deactivated as desired. Activation of an electromagnet occurs due to receipt of electrical current by the electromagnet. In these embodiments, deflection assembly **220** may additionally include one or more power sources **262** in electrical communication with the magnets **260**, which may provide electrical current to the magnet(s) **260** to activate the magnets(s) **260**. In other embodiments, as illustrated in FIG. **11**, a magnet **260** may be a permanent magnet which constantly emanates a magnetic field.

In exemplary embodiments, the magnets **260** may be disposed external to the tub **104**, as shown. Further, it should be noted that in the embodiments illustrated in FIGS. **9** through **11**, magnets **260** interact with the deflection units **222** directly to move the deflection units **222**. In these embodiments, the deflection units **222** are thus formed from suitable magnetic materials. Alternatively, however, additional magnets may be connected to the deflection units **222** to interact with the magnets **260**, and deflection units **222** need not be formed from magnetic materials.

Referring now to FIG. **11**, in the embodiment shown, only first ejection heads **206** are utilized, and the deflection unit **222** only includes first deflection surface **224**. The deflection unit **222** is translatable on guide rails **230**. The deflection unit **222** is movably, such as translatably, connected to the guide rails **230**. Further, the deflection unit **222** is movable, such as translatable, along the guide rails **230** due to translation of a magnet **260**. Accordingly, the magnet **260** may additionally be movable, such as translatable along the translational direction of the deflection unit **222**.

For example, in exemplary embodiments, a deflection assembly **220** may include a drive assembly **270**, which may for example include a motor **272** which is operably connected to a drive rail **274**. The magnet **260** may be translatably connected to the drive assembly **270**. For example, the drive rail **274** may be operable to translate the magnet **260** are desired. Drive rail **274** may, for example, be a worm or rack gear, which may for example be driven by a worm gear or pinion gear, as is generally understood. Other suitable drive rails **274** which facilitate such translational movement of the magnet **260** are additionally within the scope and spirit of the present disclosure. Operation of the motor **272** may drive the drive rail **274**, which may in turn cause translation of the magnet **260**. Due to the magnetic interaction between the magnet **260** and deflection unit **222**, the deflection unit **222** may translate in response to translation of the magnet **260**.

Referring now to FIGS. **9** and **10**, in the embodiments shown, deflection assembly **220** includes pivot rails **250**, and deflection units **222** connected to the pivot rails **250**. Each deflection unit **222** is rotatable about a pivot axis **252** defined by the connected pivot rail **250**. Further, deflection assembly includes a plurality of magnets **260**. A magnet **260** may, for example, be associated with each deflection unit **222**, as shown. Each deflection unit **222** may be rotatable about a pivot axis **252** an associated pivot rail **250** based on actuation of an associated magnet **260**, which in these embodiments may be an electromagnet.

For example, actuation of an associated magnet **260** may move the associated deflection unit **222** between a deflecting position and a bypass position. In the embodiment shown in FIG. **9**, a deflection unit **222** is rotatable towards a deflecting position when an associated electromagnet **260** is deactivated and rotatable towards a bypass position when an associated electromagnet **260** is activated. In the embodiment shown in FIG. **10**, a deflection unit **222** is rotatable towards a deflecting position when an associated electromagnet **260** is activated and rotatable towards a bypass position when an associated electromagnet **260** is deactivated.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

What is claimed is:

1. A dishwasher appliance, comprising:

a tub that defines a wash chamber for receipt of articles for washing;

a rack assembly arranged within the tub;

a fluid ejection assembly, the fluid ejection assembly comprising an ejection head disposed within the wash chamber, the ejection head operable to eject fluid into the wash chamber; and

a passive deflection assembly, the passive deflection assembly comprising a movable deflection unit disposed within the wash chamber for deflecting fluid from the ejection head towards the rack assembly and a pivot rail, the deflection unit connected to the pivot rail and rotatable about a pivot axis defined by the pivot rail between a deflecting position wherein fluid ejected from the ejection head contacts the deflection unit and a bypass position wherein fluid ejected from the ejection head bypasses the deflection unit, wherein movement of the deflection unit is caused by fluid force acting on the deflection unit.

2. The dishwasher appliance of claim **1**, wherein the fluid ejection assembly comprises a plurality of ejection heads, the plurality of ejection heads comprising a first ejection head operable to eject fluid in a first ejection direction and a second ejection head operable to eject fluid in a second opposing ejection direction.

3. The dishwasher appliance of claim **1**, wherein the passive deflection assembly further comprises a mechanical energy storage device, the mechanical energy storage device biasing the deflection unit towards the ejection head.

4. The dishwasher appliance of claim **3**, wherein the mechanical energy storage device comprises a spring.

5. The dishwasher appliance of claim **1**, wherein the passive deflection assembly further comprises a biasing element, the biasing element biasing the deflection unit towards a deflecting position wherein fluid ejected from the ejection head contacts the deflection unit.

6. The dishwasher appliance of claim **1**, wherein the passive deflection assembly comprises a plurality of movable deflection units.

7. The dishwasher appliance of claim **1**, wherein the deflection unit comprises a deflection surface, the deflection surface having a generally curvilinear profile.

8. A dishwasher appliance, comprising:

a tub that defines a wash chamber for receipt of articles for washing;

a rack assembly arranged within the tub;

a fluid ejection assembly, the fluid ejection assembly comprising an ejection head disposed within the wash chamber, the ejection head operable to eject fluid into the wash chamber; and

a deflection assembly, the deflection assembly comprising a deflection unit disposed within the wash chamber for deflecting fluid from the ejection head towards the rack assembly, the deflection assembly further comprising a magnet operable to move the deflection unit,

wherein the magnet is an electromagnet, and wherein the deflection assembly further comprises a pivot rail, the deflection unit connected to the pivot rail and rotatable about a pivot axis defined by the pivot rail based on actuation of the electromagnet.

9. The dishwasher appliance of claim **8**, wherein the deflection unit is rotatable towards a deflecting position when the electromagnet is deactivated and rotatable towards a bypass position when the electromagnet is activated, wherein fluid ejected from the ejection head contacts the deflection unit in the deflecting position and fluid ejected from the ejection head bypasses the deflection unit in the bypass position.

10. The dishwasher appliance of claim **8**, wherein the deflection unit is rotatable towards a deflecting position when the electromagnet is activated and rotatable towards a bypass position when the electromagnet is deactivated, wherein fluid ejected from the ejection head contacts the deflection unit in the deflecting position and fluid ejected from the ejection head bypasses the deflection unit in the bypass position.

11. The dishwasher appliance of claim **8**, wherein the magnet is disposed external to the tub.

12. The dishwasher appliance of claim **8**, wherein the deflection assembly comprises a plurality of deflection units.

13. The dishwasher appliance of claim **8**, wherein the deflection unit comprises a deflection surface, the deflection surface having a generally curvilinear profile.

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